
Hopf25

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Exact module categories over $\text{Rep}(u_q(\mathfrak{sl}_2))$

A classical result by Moerdijk and McCrudden is that Tannaka reconstruction for bialgebras may be lifted to bimonads: there is a bijection between monoidal structures on the Eilenberg–Moore category of a monad T that are compatible with the forgetful functor, and bimonad structures on T . This theorem may even be generalised to comodules over a bimonad.

In contrast to these kinds of reconstruction results is Deligne reconstruction, where one does not require a forgetful functor. This comes at the cost of not recovering the algebraic object of interest on-the-nose, but only up to Morita equivalence. This talk generalises a Deligne reconstruction result of Ostrik about Hopf algebras on a finite tensor categories to the general case of characterising lax module monads on a nice module category over a general abelian monoidal category with enough projectives. Crucially, the proof does not need any rigidity assumptions on the underlying category.

As an application, we give conceptual proofs of the fundamental theorem of Hopf modules, and the fact that a bimonad is Hopf if and only if it is strong as a module monad over its base category.

The talk is based on joint work with Matti Stroiński (<https://arxiv.org/abs/2409.00793>).